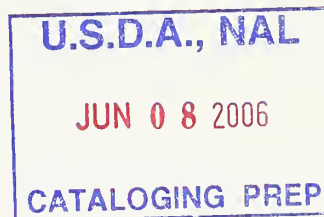


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A NATIONAL PROGRAM FOR THE
FORTIFICATION OF WHEAT FLOUR
WITH IRON - EGYPT

(A Preliminary Draft of a Proposed
Activity to Fortify Wheat Flour
with Iron to Alleviate Iron
Deficiency Anemia in Egypt)

March 27, 1985

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1.0 ACTIVITY RATIONALE AND OBJECTIVES

1.1 Activity Rationale:

Anemia is a serious public health problem throughout Egypt. According to a 1978/80 survey, 38% of all preschool children are anemic and one-third of these have severe anemia. Other studies have shown that anemia is also widespread among school children (20-50% anemic) and pregnant and lactating women (25% anemic). In addition, recent tests in Egypt have indicated that the vast majority of anemia is caused by iron deficiency and, therefore, the problem can be expected to be alleviated through increased iron intake.

Iron deficiency anemia affects the physical and mental performance of the population, particularly women and young children. Mild anemia can lead to weakness, fatigue, irritability, lightheadness, headache and shortness of breath. Moderate to severe iron deficiency anemia impairs work capacity and performance. In pregnant women, anemia increases morbidity and mortality and sometimes results in premature delivery. Anemic children do not thrive, are more susceptible to infections, and death may result from diseases accompanying the anemia. Consequently, iron deficiency anemia lowers the quality of life and adversely affects economic and social development in Egypt.

Iron deficiency anemia may be overcome through three types of public health interventions. These include (1) oral supplementation with iron-containing tablets, (2) diet modification to increase the intake of iron and improve absorption of iron, and (3) fortification of staple foods with iron.

During October 1983, the GOE convened a workshop in Cairo to consider the problem of iron deficiency anemia and to devise a strategy for overcoming it. The workshop concluded that:

- (1) A national program for the fortification of wheat flour with iron should be implemented as a general approach to increase iron intake throughout the population. The flour should be fortified with 10 mg. of bioavailable iron per pound of flour which would provide roughly one-half the recommended dietary allowance for iron.
- (2) Special iron fortified weaning food supplements should be made available to weaning age children (up to 36 months) because this group would not consume sufficient wheat flour to be effected by the proposed wheat flour fortification program.

- (3) A national program to provide iron supplements to all pregnant women (during the second and third trimesters) and to lactating women (for six weeks after delivery) should be implemented. In addition, iron supplements should be given to school children in rural areas where anemia is more prevalent.
- (4) A nutrition education program should be undertaken in support of the fortification and supplementation programs and also to promote consumption of iron rich foods and to encourage dietary practices to increase absorption of iron.

With reference to the proposed national program for the fortification of wheat flour with iron, it has been concluded that a pilot project must be undertaken to establish the effectiveness and obtain information which supports the safety of fortification before proceeding with implementation of a national program. The pilot project will be developed and partially funded through the Joint Working Group's Iron Fortification Project; the balance of funding will be sought either from the Science and Technology project Childhood Disease Control activity or the Child Survival project. (Implementation of the pilot project will not proceed until complete funding is assured). The pilot project will have a duration of five

years and is expected to provide information demonstrating the favorable impact of iron fortification of wheat flour in Egypt. While the project has not yet been designed, it is anticipated that it will include (1) distribution of iron fortified wheat flour in a limited area(s) of Egypt in ways which will simulate as closely as is reasonably possible the circumstance of a national fortification program, (2) intensive monitoring of the distribution and impact on a periodic basis in the pilot area(s) and in a control area(s), and (3) analysis of the results in terms of effectiveness and safety of the intervention as a means of improving iron status in Egypt.

The activity described in this document provides for follow-on to the iron fortification pilot project to implement a national program of fortification of wheat flour to help alleviate iron deficiency anemia. Other activities proposed in the 1983 strategy which will be supported by the USAID (iron fortified weaning food, iron supplements, and nutrition education) are described in other components of the overall CHILD SURVIVAL PROJECT.

1.2 Activity Objectives:

The CHILD SURVIVAL PROJECT has been developed as a broad based, multi-component approach to improve the health and nutritional status of infants and children in Egypt. It consists of a group of interrelated activities in the areas of acute respiratory infections, immunization, nutrition, and training of health personnel. The overall goal of the CHILD SURVIVAL PROJECT is to improve the health of the Egyptian people and its purpose is to reduce morbidity and mortality in infants, children, and women of child-bearing age.

Activities within the nutrition component of the CHILD SURVIVAL PROJECT include (1) development and introduction of a weaning food supplement to provide an inexpensive, nutritious food supplement for infants and young children, (2) nutrition education to promote improved dietary practices, and (3) alleviation of iron deficiency anemia through fortification of wheat flour, and prevention and treatment of anemia through the provision of supplementary iron tablets. The purpose of the nutrition component is to reduce child morbidity and mortality through improved availability and consumption of those nutrients known to be deficient in the diets of Egyptian children.



The purpose of the activity is to fortify domestically milled wheat flour with iron. Egyptian flour mills will be equipped to fortify flour and the activity monitored to verify the effectiveness of the operations and the nutritional impact. The objective of the fortification activity is to help alleviate iron deficiency anemia as a public health problem in Egypt.

1.3 Activity Elements:

Approximately 8.0 million tons of wheat is consumed in Egypt annually of which over 90% is used as flour to produce bread. Most of the flour (80%) is milled from domestic and imported wheats in Egyptian flour mills while the remainder is imported as flour (20%). Egypt has a total of 210 flour mills of which 172 are in the public sector and 38, most of which are small mills, are in the private sector. Of the 210 mills in Egypt, 54 are roller mills, and the remaining 156 are stone mills. During 1984, public mills milled 93% of the wheat and private mills milled 7% of the wheat.

Bread is consumed regularly and in large quantity throughout Egypt by all population segments except infants and children who are too young to consume large amounts. Per capita consumption of wheat flour in Egypt of 170 Kg. per year is one of the highest in the world. Government subsidies for bread and a long tradition of bread consumption assures that bread will maintain an important place in the Egyptian diet. Therefore, wheat flour represents an ideal vehicle for iron fortification. Fortification of the flour at the mills rather than in bakeries is preferred because of the relatively smaller number of mills.

The technology for fortifying wheat flour is simple, inexpensive, and has been applied in the U.S. and many other developed and developing countries for many years. While iron fortification has not been practiced in Egypt, the results of the iron fortification pilot project are expected to verify that fortification will lead to an improvement in iron status in the population. In addition, monitoring will be carried out during the project and subsequent to completion of the project to confirm the impact and to provide guidance, if necessary, for adjustments in the program to optimize the effectiveness.

At this time no Egyptian laws or regulations either permit or prevent fortification of wheat flour with iron. As a precondition to implementation of the national fortification program, the Ministry of Health, Department of Food Control, will prepare and the Ministry will issue an official statement to the effect that (1) iron fortification of wheat flour in Egypt will be safe and wholesome and will cause no adverse health effects; and (2) fortification is expected to help alleviate iron deficiency anemia and, therefore, is expected to be a socially beneficial program in the best interests of the Egyptian public. The Ministry's statement will include guidance as to the amounts and kinds of iron fortificants that can be used and any other requirements or limitations regarding fortification.

Fortification is accomplished by continuously feeding a dry powder containing iron (the iron premix) into the flour during flour milling and mixing the premix and flour either in the existing milling system or in a simple mixer added to the mill for that purpose. Most Egyptian mills require only an iron premix feeder which costs \$2000 - 3000; those mills which require additional mixing equipment as well can be fitted for less than about \$5000 each. The total capital costs for equipping essentially all Egyptian mills to fortify flour with iron will be roughly US \$600,000.

The iron premix, a mixture of a suitable, bioavailable iron compound and starch or flour, is available from a number of international commercial sources but can easily be formulated and packaged in Egypt. Food grade iron compounds are not presently made in Egypt and must be imported for the activity. The cost of iron premix (to provide 10 mg. iron per pound of flour) is about US \$0.35 per ton of flour or approximately US \$2.3 million per year (1985 prices) for the 6.5 million tons of domestic and imported flour used in Egypt.

Fortification of wheat flour will not alter the color, flavor, odor, breadmaking characteristics, or any other properties of the flour or bread and therefore will not be noticable by either bread bakers or the public at large. However, it is expected that iron fortification will become public knowledge as a matter of course. Therefore, it is essential to make the public aware of the positive aspects of the fortification activity in a way that assures favorable attitudes toward the program. At the same time, the activity should be closely monitored to assess the operational performance as well as the nutritional aspects of iron fortification.

The iron fortification activity will include the following four elements:

(A) Fortification:

- Procurement and installation of fortification equipment in Egyptian mills, and training of equipment operators and equipment service personnel.
- Import of iron fortificant.
- Arrangement for fortification of imported flour.

(B) Public Information:

- Designing and undertaking a public information program to assure public acceptance of iron fortified wheat flour and assessing effectiveness of the program.

(C) Monitoring:

- Monitoring the process of fortification to assure that the flour contains the proper amount of fortificant.
- Monitoring the iron status of the population to verify the impact of fortification and provide guidance to modify the activity, if necessary, to promote optimum impact.
- Monitoring the attitudes of the public to verify acceptability of fortified wheat flour.

(D) Evaluation:

- Periodically evaluating progress on all aspects of the program

2.0 COST ESTIMATE AND FINANCIAL PLAN

2.1 Budget Summary:

The total cost of this three-year activity is estimated to be US \$7.4 million of which the USAID will provide US \$6.2 million as a grant to the GOE. The GOE will provide US \$1.2 to pay for a part of the expenses for fortification.

The cost estimates include a 5% inflation factor for materials and services procured outside Egypt and a 20% inflation factor for procurements within Egypt. The cost estimate includes only costs directly attributable to the development and application of fortification as a new public health intervention in Egypt over the three year life of the activity; costs to institutions involved in the project which are not directly attributable to fortification as a new activity are specifically excluded from the estimate.

A summary of the costs of each project element is provided in Table I. Costs are presented in terms of those expenditures made in US \$ and those made in LE with all costs expressed in US \$ (based on LE. 0.83 = US \$1.00). Sixty three percent of all expenditures, \$4.64 million, will be made in US \$ and 37 percent, \$2.73 million, in LE.

TABLE I - Activity Cost Summary
(US \$ thousands)

Activity Element	Expended as \$	Expended as LE	Expended by USAID	Expended by GOE	Total
<u>Fortification</u>					
- Equipment & Installation	777.0	520.5	1,297.5	-	1,297.5
- Iron Premix	3231.0	-	2,017.5	1,213.5	3,231.0
Subtotal	4008.0	520.5	3,315.0	1,213.5	4,528.5
<u>Public Information</u>	32.0	383.5	415.5	-	415.5
<u>Monitoring</u>					
- Fortification Process	62.5	397.5	460.0	-	460.0
- Nutrition	181.0	505.5	686.5	-	686.5
Subtotal	243.5	903.0	1,146.5	-	1,146.5
<u>Management</u>	297.5	920.0	1,217.5	-	1,217.5
<u>Evaluation</u>	55.0	-	55.0	-	55.0
Total	4,636.0	2,727.0	6,149.5	1,213.5	7,363.0
% of Total	63.0	37.0	83.5	16.5	100.0

Note: All costs are expressed in US \$ (based on LE. 0.83 = US \$1.00) with adjustments for inflation included assuming project takes place during 1990-1992 and assuming an inflation rate of 5% per year for US \$ and 20% per year for LE.

As shown in Table I, funds for all project costs will be provided by USAID except the costs for fortification of imported flour and part of the costs of the fortificant (iron premix) used to fortify domestically milled wheat flour. The figures in Table I include USAID contributions toward the costs of iron premix of 100% during years 1 and 2, and 50% during year 3. All costs of premix and other inputs will be borne by the GOE upon completion of the activity after year 5. During the activity 83.5% of the costs will be provided by the USAID and 16.5% by the GOF.

2.2 Cost Estimate by Year:

A summary of project costs by activity year is given in Table II. Details of costs for each activity element are listed in Annex 6.2.

TABLE II
Activity Costs by Year (US \$ thousands)

Funding Source	Activity Year			Total
	1	2	3	
USAID	1,869.5	1,819.0	2,461.0	6,149.5
GOE	-	-	1,213.5	1,213.5
Total	1,869.5	1,819.0	3,674.5	7,363.0

3.0 Implementation Plan:

Although fortification of wheat flour utilizes a simple well-established technology, implemenatation of the fortification program in Egypt will involve a large number of interrelated activities which require planning, close coordination, and tight management. In addition, since the Ministries of Health, Supply, and Agriculture, and several other Ministries and Egyptian institutions will participate along with the USAID in the project, an interface between the activity and those agencies is required to permit them to provide policy guidance and to be kept abreast of implementation activities.

A National Child Survival Steering Committee has been established in the Ministry of Health (MOH) under the Chairmanship of the First Secretary to provide policy guidance and oversee the CHILD SURVIVAL project. In addition, it is anticipated that a CHILD SURVIVAL Secretariat will be established within the MOH to coordinate activities and provide management of the CHILD SURVIVAL project and its component activities.

Policy guidance and oversight related to the health aspects of the wheat flour fortification activity will be provided by the National Child Survival Steering Committee, the

membership of which will be expanded to include representatives from the Ministry of Supply and such other ministries and agencies as deemed appropriate by the Steering Committee. A Coordination Unit or project officer will be established within the Child Survival Secretariat to provide coordination with other CHILD SURVIVAL project activities and among the various elements of the Fortification activity. The services of the Coordination Unit, including personnel, office facilities, etc. will be provided through the overall CHILD SURVIVAL project and will not be budgeted as a part of the Fortification Activity.

The Fortification Activity will be implemented in part by the Ministry of Supply and in part by the Ministry of Health.

The Ministry of Supply will be responsible for implementation of activities related to procurement, installation and operation of the fortification equipment in Egypt, fortification of imported flour, and monitoring of the process of fortification.

The Ministry of Supply will establish a special management unit (MU) within the Flour Milling Authority to (1) oversee the MOS agencies and subordinate flour milling companies that are responsible for implementing the activity to

assure that all tasks are completed on time and in a satisfactory manner, (2) to coordinate the procurement of technical assistance, services, and commodities for the activity and to oversee process monitoring activities, (3) to organize and provide information required for formal activity evaluations, (4) to compile and distribute periodic progress reports and special topical reports concerning the activity, and (5) to administer financial inputs provided by USAID to the MOS to implement the activity. The staff of the Management Unit will consist of a full time project manager, an administrative assistant, and a secretary, all of whom will be employees of the Ministry of Supply. A full time American project advisor will be assigned to the Management Unit for the life of the project to assist with management of the activity and coordination with activity elements administered by the MOH and with USAID; the advisor will be provided through CARE or an equivalent organization.

The Ministry of Health will be responsible for monitoring the effectiveness of fortification and for undertaking the public information element and assessing its effectiveness through the Nutrition Education component of the CHILD SURVIVAL project. A unit will be established within the MOH to be responsible for monitoring effectiveness as an on-going activity.

The Wheat Flour Fortification Activity will begin after completion of the fortification pilot project and after a determination by the GOE and USAID that a national wheat flour fortification program is merited. The activities of the pilot project and the national fortification program will merge in such a way that fortification and monitoring in the areas of the pilot project will be continuous; there will be no interruption in the distribution of fortified flour in areas covered by the pilot project.

It is anticipated that the pilot fortification project will commence at or near the beginning of the CHILD SURVIVAL project and will have a duration of five years. The national wheat flour fortification activity will commence upon termination of the pilot project (five years after initiation of the CHILD SURVIVAL project) and will have a duration of three years. In case the pilot project permits an earlier or later determination to proceed with a national program, the national fortification activity will commence immediately after that determination is made.

During the first two years of the national fortification project, equipment will be procured and installed in essentially all of Egypt's flour mills to fortify the flour with iron, mill operators and equipment service personnel within the Ministry of Supply's eight Flour Milling companies and in the effected private sector mills will be trained, iron premix will be procured from the U.S., and

plans for monitoring the fortification process will be prepared and personnel trained in monitoring, and fortification of domestically milled wheat flour started as a National program.

Also during the first two years detailed plans for monitoring the iron status of the population will be completed, monitoring equipment obtained and personnel trained, and during the year immediately before fortification begins, national base line data on iron status collected. The public information campaign will be developed and pretested during the first year and the campaign implemented on a National basis at a time corresponding with large-scale introduction of fortified flour in the market.

During the remaining year, the process of fortification and the iron status of the people of Egypt will be monitored closely and adjustments in operational procedures, fortification levels, monitoring procedures, etc. made as required. As rapidly as possible arrangements for fortification of imported flour will be completed. Upon completion of the third year, all flour, domestic and imported, will be fortified and an ongoing, tested monitoring system will be in operation.

Formal evaluations will be undertaken jointly by the GOE and the USAID at key points during project implementation.

3.1 Pre-Fortification Activities (Year 1-2) *:

3.1.1 Plan:

The Management Unit within the Ministry of Supply will be formed and will prepare and obtain GOE and USAID approval for a comprehensive plan and schedule of life-of-project activities (1I). The MU will periodically update the plan and schedule to reflect changes which might be needed.

3.1.2 Continuation of Distribution of Fortified Flour in Pilot Area:

Distribution of iron fortified flour in the pilot area will be continued without interruption in the pilot area during the period after the conclusion of the pilot project and until the beginning of a complete national program. Inputs required for

* The duration of project activity will be specified in the text by citing the project year (1 through 3) and quarter (I through IV). For example an activity occurring during the second through fourth quarter of the third year will be specified as 3II - 3IV.

fortification and monitoring of the process of fortification will be provided through this national program activity; inputs for continuation of nutritional monitoring in the pilot and control areas will be borne by the pilot project if continuation of nutritional monitoring in those areas is deemed necessary. (For purposes of budgeting, it will be assumed the pilot project will encompass 5% of the country and require fortification of 5% of the domestically milled and imported flour). (1I-2IV).

3.1.3 Equipment Procurement:

Fortification equipment and iron premix will be procured through contract from the U.S., the equipment installed with technical assistance from the U.S., and mill operators trained in the operation of the equipment (via a contract for a complete package including all of the inputs cited here if possible) (1III-2IV). While not all mills will be large enough to merit being equipped to fortify flour, and while the number of operating mills in Egypt changes each year, the project will provide for equipping 200 mills.

3.1.4 Process Monitoring:

A scheme for monitoring the process of fortification will be devised and monitoring personnel trained.

The process will include regular collection and analysis of flour samples from each flour mill, regular inspection of the performance of flour fortification equipment, and random sampling and analysis of bread (1III-2IV).

3.1.5 Nutritional Monitoring:

A scheme for monitoring the nutritional effectiveness of iron fortification on a national basis will be devised, laboratory facilities established, equipment and supplies procured, and monitoring personnel trained. The monitoring process will probably include collection of iron status data from young adult men and young adult women. Data will possibly be obtained from a national sample of 1500 persons in each category selected to represent best the effect of the fortification program. Baseline data will be collected before fortification begins. (1III-2II) and the groups might be reexamined annually or at other intervals appropriate to obtaining information concerning iron status. Nutritional monitoring will continue indefinitely beyond the life-of-the-project to provide an ongoing assessment of the iron status of the Egyptian population.

3.1.6 Public Information:

A public information organization will be contracted to develop and undertake a campaign to inform the public concerning the GOE iron fortification program and its value to the Egyptian population. The campaign, which is expected to utilize mass media primarily, will be developed, pretested, and readied for launch concurrently with the initial introduction of iron fortified wheat flour at the end of the second project year (1III-2IV).

3.1.7 Commercial Sector Involvement:

For purposes of project design, it will be assumed that iron premix, premix feeders and parts will be supplied from the U.S. under contract throughout the life of the project. However, during the project, Egyptian commercial sector organizations will be contacted and their participation solicited as suppliers of fortification equipment, iron premix, and mill services to all mills on a continuing basis. Use of Egyptian made premix would be expected to reduce the cost of premix from US \$ 1.00 per pound to about US \$.0.75 per pound (1985 prices) and reduce

foreign exchange costs for premix by approximately 60%. (Because this will require development of a new business in Egypt and possibly will involve technology transfer, licensing or joint venture arrangements, establishment of new facilities, and other business activities, no schedule for completion will be established).

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3.2 Fortification Activities (Year 3):

3.2.1 Fortification of Egyptian Milled Flour:

The process of fortification will be continuously monitored by mill management, by Ministry of Supply mill inspectors, and by project personnel. Mill management will regularly confirm that the premix feeders are operating and qualitatively check the flour daily for iron content. Each week the Ministry of Supply inspectors will also confirm proper operation of the feeders and collect flour samples for quantitative verification of iron content. The MOS will also verify proper fortification through frequent, random checks at the mills and bakeries to confirm that the equipment is operational and the flour contains the proper level of fortification. Malfunctions of equipment and improper fortification levels will be reported immediately to the MOS (3I-3IV).

Upon establishment of Egyptian commercial sector organizations capable of providing equipment, premix, and related services, the Ministry of Supply will enter into appropriate contracts and agreements with the organizations to supply commodities, and services necessary to maintain effective operations. (3I-3IV).

3.2.2 Fortification of Imported Flour:

The Ministry of Supply will establish procurement specifications which require that all wheat flour imported into Egypt must be fortified with the proper amount and type of iron. During 1984, Egypt imported a total of 1.6 million tons of wheat flour from France (847 thousand), US (404 thousand), Yugoslavia (33 thousand), Germany (26 thousand), Italy (24 thousand), Belgium (19 thousand), Spain (12 thousand), and Holland (11 thousand). An appropriate lead time will be provided to permit exporters to establish the facilities necessary to comply with the Ministry of Supply's requirements. Fortification of imported flour might commence during the final project year or after completion of the project. Costs for fortification of imported flour will not be borne by the project in either case but will be borne entirely by the GOE.

3.2.3 Public Information Activity:

The public information campaign developed during the pre-fortification period (3.1.6) will be launched when fortification starts and continued until the public has a positive attitude toward fortification.

The campaign is expected to include radio and TV segments explaining the benefits of iron fortification as well as mailings and direct contacts with select groups such as physicians and bakers. Although the campaign might be terminated after one year, provisions will be made to continue it throughout the life of the project should this be necessary because of unforeseen but adverse reactions to fortification by some segment of the population. (3I-3IV).

The effectiveness of the campaign and potential adverse attitudes toward fortification will be assessed through consumer surveys.

3.2.4 Monitoring of Impact:

The impact of fortification will be monitored by assessing changes in the iron status of 1500 each national samples of two indicator groups such as young adult men and young adult women for whom data were collected in the baseline survey during the pre-fortification period (3.1.5). Iron status will be assessed by collecting blood samples and measuring five parameters which collectively indicate iron

status (hemoglobin, serum iron, erthrocyte protoporphyrin, serum ferritin and transferrin absorption). Changes in hemoglobin will reflect reduction in prevalence of anemia and crudely indicate reduction in iron deficiency anemia brought about through the program. Analysis of the set of five parameters will permit more precise determination of iron deficiency anemia, body stores of iron, and other factors which will help interpret the effects of the program and to consider adjustments to optimize program effectiveness. Because changes in iron status are expected to take place slowly, data will be collected during the third project year and periodically thereafter. The full effect of the program is not expected to be realized for 10 or more years.

As an ethical consideration, any persons identified as having severe anemia during data collection will be referred to appropriate health authorities for treatment. While no ill effects due to iron fortification are expected, monitoring analysis will be designed to identify any such effects if they should occur.

3.2.5 Evaluation:

Evaluations of all aspects of the project, including management, implementation, and effectiveness of the activity will take place during the second and third project years.

3.3 Administrative Considerations:

The Wheat Flour Fortification activity will be implemented jointly by the Ministries of Supply and Health, and will be administered by the Steering Committee of the CHILD SURVIVAL project through the Committee's Secretariat. Upon completion of the project, the fortification Management Unit within the Ministry of Supply, and the Coordinating Unit in the Steering Committee Secretariat will be abolished.

During project implementation, the Ministry of Supply will be the lead agency responsible for the mechanics of fortification and the Ministry of Health, through the Nutrition Institute, will be the lead agency responsible public information and impact monitoring. Perpetuation of the program as a national public health activity after completion of the project, including funding of recurring costs, will be the joint responsibility of the Ministries of Supply and Health.

3.4 Activity Schedule:

Activity Element	Activity Year		
	1	2	3
<u>Fortification</u>			
Continuation of Fortification in Pilot Areas.			
Equipment Procur. & Install.			
Fortification of Domestic Flour			
<u>Public Information</u>			
Campaign Development			
Campaign Implementation			
Campaign Assessment			
<u>Monitoring</u>			
Fortification Process			
Nutrition			
Baseline	1 - - - - - 1	1 - - - - - 1	
Intervention			
<u>Evaluation</u>			

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4.0 CONDITIONS AND COVENANTS

Before the GOF and the USAID enter into a formal Project Agreement, the GOF will certify to the USAID that the following conditions have been met:

1. The Ministry of Health, Office of Food Control, will have certified in writing that (1) iron fortified wheat flour is safe and wholesome, is expected to help alleviate iron deficiency anemia and its consequences, and is permitted as a public health intervention in Egypt, and (2) provides guidelines as to the types and amounts of iron fortificant that are permitted in domestically milled and imported wheat flour.
2. The Ministry of Supply will have issued a statement specifying that it will, contingent upon availability of resources, arrange for iron fortification of all wheat flour (1) produced in Egyptian flour mills where fortification is technically feasible and (2) imported into Egypt.

During the activity, the Ministry of Supply will issue guidelines to public and private sector flour mills specifying (1) the amount and type of iron fortificant which will be

required for fortification, (2) the mills which will be required to participate, (3) the procedures which will be used to assure proper fortification, and (4) the availability, through the iron fortification activity, of all equipment and fortificant (premix) necessary to implement the project at no cost to the individual mills or milling companies.

The GOE, through the CHILD SURVIVAL project Steering Committee Secretariat and the Ministry of Supply, will issue (1) quarterly progress reports to the USAID summarizing activities and achievements of all elements of the activity, (2) evaluation reports as cited in section 5.0, and (3) topical reports as required by the Steering Committee. Five copies of each report will be provided in the English language to the USAID.

Financial Covenants including requirements for financial reports will be as specified in the CHILD SURVIVAL Project.

5.0 EVALUATION ARRANGEMENTS

This activity will be evaluated periodically during implementation to assess progress and to provide a basis for adjustments in the purpose, outputs, and inputs if needed. The activity will also be evaluated upon completion of all essential activities but prior to close down of the project to determine if the purpose has been achieved, outputs delivered, and planned inputs made. The final evaluation will also examine "lessons learned" as a basis for improving the design of future AID-supported activities of a similar type.

All evaluations will be undertaken by a team of four experts selected jointly by the USAID and the Steering Committee. The team will consist of:

- (1) A project evaluation specialist, Team Leader.
- (2) A fortification process expert.
- (3) A social marketing expert.
- (4) A nutritionist with special expertise in iron deficiency anemia.

A subcommittee of the CHILD SURVIVAL Project Steering Committee and other persons designated by the USAID or any of the Egyptian agencies involved in the activity may also participate in all or part of the evaluations as they may wish.

The evaluations will take place in Egypt. The evaluation team will examine activity sites and review data supplied by the Steering Committee Secretariat, the Ministry of Supply, and relevant MOU units as a basis for identifying issues and framing conclusions and recommendations. A report will be issued by the Evaluation Team Leader immediately upon completion of each evaluation.

While the timing, duration, and specific scope of work for each evaluation will be determined by the USAID and the Steering Committee, it is expected that two evaluations will be undertaken as follows:

Evaluation No. 1:

The first evaluation will take place after (1) base-line data on national iron status are collected, (2) the public information campaign is designed and pretested, (3) many if not all mills have been equipped but before fortification started, and (4) plans for monitoring have been fully developed. This evaluation is expected to take place during the fourth quarter of the second activity year and have a duration of 1-2 weeks.

Evaluation No. 2:

The final evaluation will take place when (1) all participating Egyptian mills are in operation fortifying flour with iron, (2) all monitoring of process and nutrition has been made operational and utilized long enough to provide experience with which to judge performance, and (3) all other major activities completed. This evaluation is expected to take place during the fourth quarter of the third year and have a duration of 1-2 weeks.

PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK.

<u>NARRATIVE SUMMARY</u>	<u>OBJECTIVELY VERIFIABLE INDICATORS</u>	<u>MEANS OF VERIFICATION</u>	<u>IMPORTANT ASSUMPTIONS</u>
<u>PROGRAM OR SECTOR GOAL TO WHICH PROJECT CONTRIBUTES (A-1)</u>	<u>MEASURES OF GOAL ACHIEVEMENTS (A-2)</u>		<u>ASSUMPTIONS FOR ACHIEVING GOAL TARGETS</u>
To improve the Health of the Egyptian People.	Improved health and nutritional status and reduced morbidity and mortality among infants and young children.	Country health surveys and other health statistics.	Other factors affecting infant/child health do not change adversely.

PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK

<p>NARRATIVE SUMMARY B. PROJECT (ACTIVITY) PURPOSE SUMMARY (B-1)</p>	<p>OBJECTIVELY VERIFIABLE INDICATORS END OF PROJECT STATUS (B-2)</p>	<p>MEANS OF VERIFICATION (B-3)</p>	<p>IMPORTANT ASSUMPTIONS (B-4)</p>
<p>To help alleviate iron deficiency and its accompanying anemia in Egypt on a national basis through fortification of both domestically produced and imported wheat flour.</p>	<ol style="list-style-type: none"> Domestically mill wheat flour will be fortified with iron and the process monitored. Arrangements will have been made to fortify imported wheat flour. A monitoring system to assess iron status of the population will be operating. 	<ol style="list-style-type: none"> Reports from monitoring of fortification process. Procurement regulations/instructions requiring fortification of imported flour. Reports on iron status based on monitoring system. 	<p>The outcome of pilot tests will show that iron fortification of wheat flour will be effective and safe.</p> <p>The GOE will conclude the benefits of fortification are sufficiently great to merit expenditures for a national fortification program.</p>

PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK.

NARRATIVE SUMMARY PROJECT OUTPUS: (C-1)	OBJECTIVELY VERIFIABLE INDICATORS MAGNITUDE OF OUTPUS: (C-2)	MEANS OF VERIFICATION (C-3)	IMPORTANT ASSUMPTIONS
1. Essentially all Egyptian flour mills equipped to fortify wheat flour with iron.	1. Approximately 200 mill units producing approximately 5,000,000 tons per year of flour equipped.	1. Engineering reports.	
2. Iron premix obtained, supplied to mills, and added to flour.	2. Approximately 2.3 million lbs. of iron premix obtained and added to flour.	2. Receiving reports; mill monitoring reports.	
3. Process and nutrition monitoring systems developed, personnel trained, equipment procured and installed, and monitoring undertaken.	3. Monitoring systems examining production in 200 milling units and flour in rep. sample of bakeries; monitoring systems examining iron status of two 1500 person samples of young adult men and women.	3. Monitoring reports.	
4. Public information program developed, tested, implemented, and evaluated.	4. Public information program undertaken Nationwide through radio and TV.	4. Public information reports.	
5. Plans and arrangements for fortifying imported flour made.	5. Arrangements for fortification of 1,500,000 tons per year of imported flour made.	5. Ministry of Supply directives and procurement orders.	

PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK

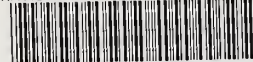
NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<u>D. PROJECT INPUTS</u>			
<u>USAID (D-1)</u>	(D-2)	(D-3)	
Grant to provide	1. USAID		Project Records.
- equipment and part of premiss		US \$3,422,500	
- technical assistance *		IE. 2,263,500	
- management and operational expenses	2. GOE	US \$1,213,500	
- evaluation.		Total US \$7,363,000	

GOE

Ministry of Supply budget to provide
- part of premiss.

* Technical assistance includes 14 person months of short term technical advisors (Fort. equip - 4.5, Fort process monitor - 2.0, Nut. monitor - 2.0, public info - 2, and evaluation 3.5) and 36 person months of long term advisors to the MOS management unit.

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